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発送日付：2003.09.01
提出期限：2003.11.01

特　許　庁
意見提出通知書

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出願番号　１０－２００１－００４５６８１

発明の名称　液晶表示パネルの製造方法及びシール硬化用の緩衝板

本出願に対する審査結果、下記のような拒絶理由があり、特許法第６３条の規定によりこれを通知するので、意見があるか補正を行う必要がある場合は、上記期限までに意見書[特許法施行規則別紙第25号の２書式]又は/及び補正書[特許法施行規則別紙第５号書式]を提出されたい(上記期限について毎回１ヶ月単位で延長を申請することができ、この申請について別途の期間延長承認通知はしない)。

[理由]

本出願の特許請求範囲第1～19項に記載された発明は、その出願前にこの発明が属する技術分野における通常の知識を有する者が以下に指摘したことにより容易に発明できたものであるため、特許法第29条第２項の規定により特許を受けることができない。

本出願は、特許請求範囲の記載が下記に指摘されている通り不備なものと認められ、特許法第42条第４項第２号の規定による要件を満たしていないので、特許を受けることができない。

[記]

1. 本出願の特許請求範囲第1～19項に記載された発明は、表示パネル体の非対向面側から緩衝板を介して基板間を押圧しながら熱硬化性シール材を加熱硬化させる段階などを含む液晶表示パネルの製造方法及びシール硬化用の緩衝板に関するものであって、これは、日本公開特許公報平12-187226号(2000.07.04、以下、引用発明１という)

の液晶パネルとプレス板との間に中央表示部に該当する部分が穿孔されたシートを入れてプレスによる圧力が透明基板の全表面にわたって均等に作用するようにし、両透明基板間のギャップ寸法のバラ付きを防止できるようにする技術と、日本公開特許公報平9-90374号(1997.04.04、以下、引用発明2という)の中央部が削除された形態の緩衝シートをプレス板と基板との間に挿入し、基板の間隔を全面にわたって均一に維持するための液晶表示素子の製造方法などに関する技術内容を本出願の発明と対比するとき、目的と構成及び効果が類似するため、本出願は上記引用発明1、2からこの発明の属する技術分野において通常の知識を有する者が技術的構成の困難性なく容易に発明できたものである。(特許法第29条第2項)

2. 本出願の特許請求範囲には、「所定、及び」などの比較の基準や程度、任意付加的事項などが不明な表現で記載されているなど、特許請求範囲の記載が不明である。(特許法第12条第4項第2号)

[添付]
添付1　日本公開特許公報平12-187226号(2000.07.04)　1部
添付2　日本公開特許公報平9-90374号(1997.04.04)　1部

2003年　9月　1日

特　許　庁　　審査4局
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Excerpt from
Japanese Patent Laid-Open Publication No. Hei 9-90374

[0004]
[Problems to be Solved by the Invention]
Recently, when black and white grayscale display or color display is realized by a liquid crystal display element, there arises a significant problem of color unevenness or the like caused by a difference in a distance between substrates between the center portion of the display region and the peripheral sealing portion, which has not conventionally been regarded as a problem.

[0005]
More specifically, in a liquid crystal display element, even a slight change of a distance between a pair of substrates (electrode substrates) facing each other leads to a change in the threshold voltage or a change in the lighting state, or causes interference phenomenon for changing colors remarkably, which results in loss of stable display quality. Therefore, the distance between substrates must be very accurate and allows only an error (a variation from the specified value) of within ±0.03 μm. It is found that, in order to meet the above requirement, it is necessary to apply a uniform pressure over the entire surface of the substrates during the process of sealing using a sealing material.

[0006]
However, a conventional sealing method has a problem that, because resin type granular spacers are dispersed over the entire surface of the substrates which are to be sealed whereas glass fiber is mixed as a spacer in the sealing material, due to a difference in modulus of elasticity between the resin spacer and the glass fiber spacer, a distance between the substrates becomes non-uniform between the center portion of the display region and the peripheral sealing portion, when a uniform pressure is applied to the entire surface of the substrate.

[0007]

The present invention was made in order to solve the above problem. It is an object of the present invention to provide a method of manufacturing a liquid crystal display element which can maintain a uniform distance between substrates over the entire surface when sealing the substrates using a sealing material at the periphery of the substrates by applying a pressure onto a plurality of pairs of substrates via a buffer material and which can provide a high quality image free from color unevenness and display unevenness.

[0012]

Specifically, the liquid crystal display element includes a first electrode substrate 4 formed by sequentially layering stripe-shape first electrodes 2 and an alignment film 3 on an insulating substrate 1 and a second electrode substrate 8 formed by sequentially layering stripe-shape second electrodes 6 and an alignment film 7 on another insulating substrate 5, which are disposed facing each other such that the electrodes 2 and 6 are orthogonal to each other, with a gap of 6.0 μm being maintained between the first electrode substrate 4 and the second electrode substrate 8 due to granular spacers 9. Between these electrode substrates 4 and 8, a liquid crystal composition material is enclosed. Further, polarizers 11 and 12 are provided on the outer surfaces of the respective substrates. In the drawing, numeral 13 indicates a sealing portion by the sealing material.

[0013]

In order to manufacture a liquid crystal display element having the above structure, first, with respect to the respective electrode forming surfaces of the first electrode substrate 4 and the second electrode substrate 8 respectively having the first electrode 2 and the second electrode 6 which are ITO transparent electrodes formed on the insulating substrates 1 and 5 in a known method, an alignment material is coated and a rubbing treatment is performed to form the

alignment films 3 and 7. Subsequently, granular spacers 9 are dispersed on a surface of at least one of the electrode substrates. Then, after coating a sealing material such as a thermosetting epoxy adhesive in the periphery of the substrate on which the spacers 9 are thus dispersed, the two substrates are arranged facing each other such that the electrodes 2 and 6 are orthogonal to each other, and the substrates are sealed at the periphery thereof using the sealing material which has been coated. Then, after injecting the liquid crystal composition material 10 in a gap which is created by the spacers between these substrates, the injection port is sealed with a photo-setting acrylic resin or a silicone resin, thereby obtaining a liquid crystal display element.

[0014]

The process of sealing the periphery of the substrates using a sealing material is performed in the following manner. Specifically, as shown in Fig. 2, on an aluminum plate 14 having a highly precisely finished surface, a plurality of electrode substrate pairs (substrate pairs) 15, each pair being temporarily composed of two electrode substrates, are accumulated with a buffer sheet 16 made of a fluoro-resin or the like being interposed between the substrates. Here, as shown in a plan view of Fig. 3, the buffer sheet 16 has a rectangular cut-out portion in the center along the line located toward the inner side (desirably by a distance of about 5 to 10 mm) with respect to the peripheral portion 16a which comes into contact with the sealing portion of the substrate pair 15, and is disposed such that the cut-out potion 16b does not overlap the sealing portion of the substrate pair 15.

[0015]

Next, in order to heat the plurality of substrate pairs 15 which are layered via the buffer sheet 16 evenly in the thickness direction, an equalizer 17 is inserted every several substrate pairs 15. Then, an aluminum plate 14 is further disposed on the layered product, and a pressing force is applied to the layered product by a plurality of springs 18 downwardly

in the vertical direction via the aluminum plate 14. By heating and curing the sealing material (not shown) for sealing the periphery of the substrate pairs 15 while applying a pressure as described above, a vacant cell into which the liquid crystal composition material 10 is to be enclosed is obtained.

[0016]

As described above, according to the present embodiment, because, in the sealing process in which the sealing material is heated and cured while the substrate pairs 15 are pressurized via a buffer material, the buffer sheet 16 having a cut-out portion at the center portion which contacts the display portion of the substrate pairs 15 is used, a pressure is applied in a state where only the sealing portion of the substrate pair 15 and the vicinity thereof are in contact with the buffer sheet 16. Accordingly, the substrate pairs 15 are pressurized in a state where the pair of substrates is kept parallel to each other, and non-uniformity of the distance between the substrates caused by a difference in the modulus of elasticity of spacers between the center display portion and the peripheral sealing portion can be eliminated. As a result, display defects such as color irregularity and display unevenness caused by a non-uniform distance between substrates can be eliminated and high manufacturing yield can be ensured.

[0017]

Further, in the present invention, when a heating plate having a rectangular cut-out portion in the center portion along the line located toward the inner side by a distance of about 5 to 10 mm with respect to the peripheral portion which comes into contact with the sealing portion of the substrate pair 15 is employed as the equalizer 17 which is used for even heating of the substrate pairs 15, the distance between substrates can be made more uniform over the entire surface, so that a liquid crystal display element capable of providing a higher quality image can be manufactured.